MINERAL OCCURRENCES IN THE MOUNT HENRY CLAY AREA (114P/7, 8)

By D. G. MacIntyre and T. G. Schroeter

INTRODUCTION

Mineral occurrences in the Mount Henry Clay area were visited during a two-day period in early August as part of a continuing study of volcanic-hosted massive sulphide deposits of the Insular Tectonic Belt. This report summarizes what is known to date about the geology and mineral occurrences in the Mount Henry Clay area. Much of the information in this report is from unpublished reports supplied by the United States Bureau of Mines and Stryker-Freeport Resources.

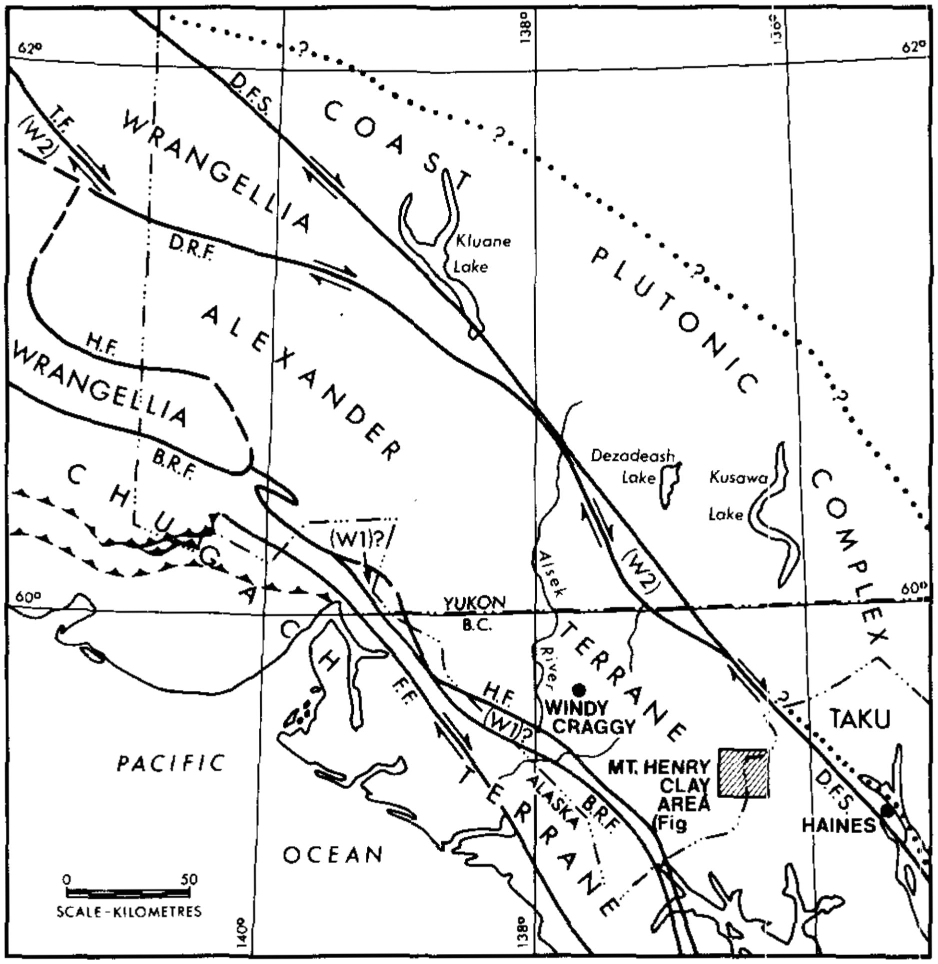

Figure 124. Location of the Mount Henry Clay area relative to major tectonic elements as defined by Campbell and Dodds (1983). B.R.F. = Border Ranges fault; F.F. = Fairweather fault; H.F. = Hubbard fault; D.R.F. = Duke River fault; D.F.S. = Denali fault system; T.F. = Totschunda fault; W1 = Wrangellia.

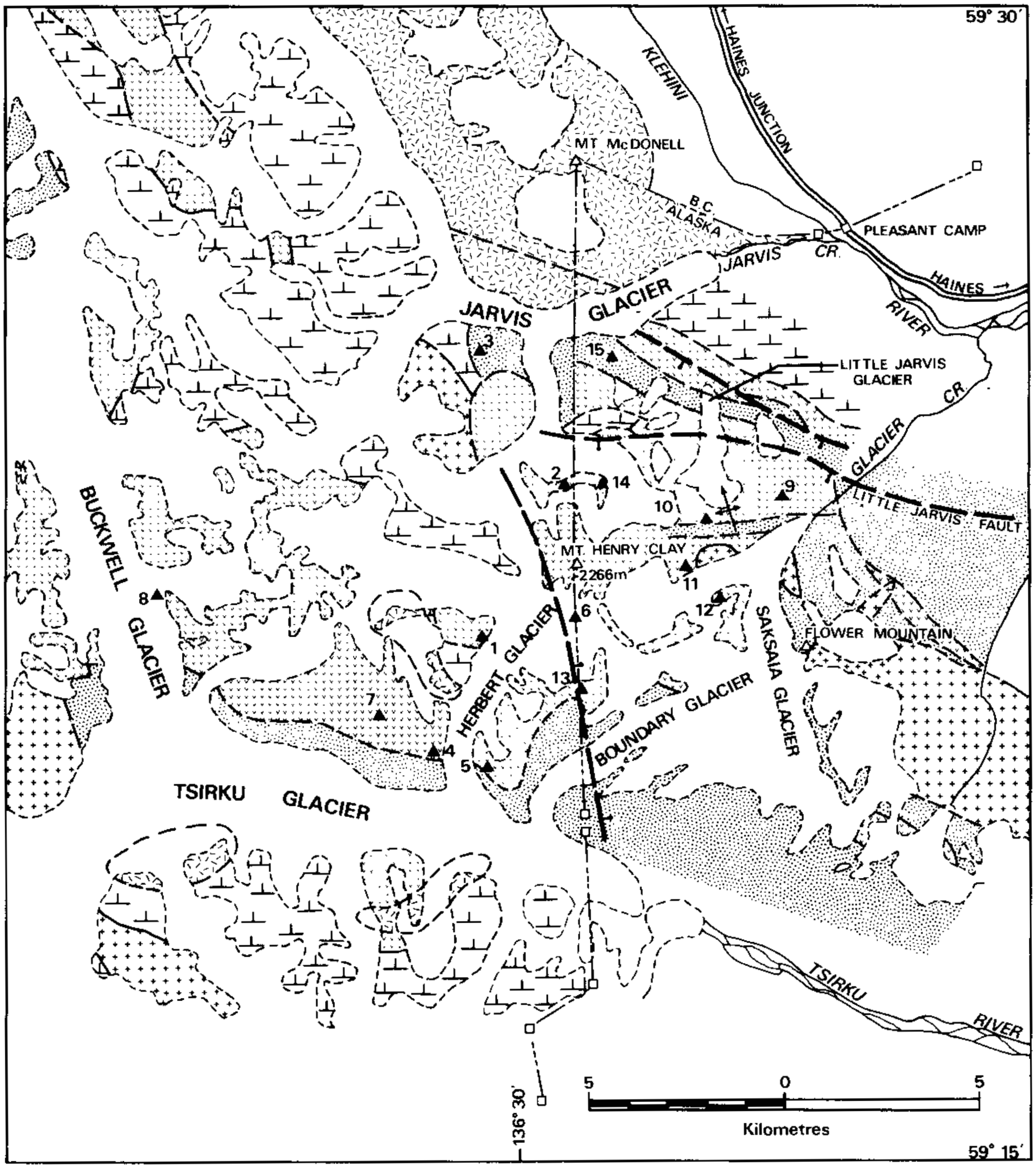

Figure 125. General geology and location of mineral occurrences, Mount Henry Clay area. British Columbia geology after Campbell and Dodds (1983); Alaska geology after Redman (Still, 1984).

LEGEND

OLIGOCENE – GRANITIC INTRUSION	**PALEOZOIC AND/OR MESOZOIC** FINE–GRAINED CLASTIC ROCKS
CRETACEOUS – TERTIARY HORNBLENDE GABBRO, DIORITE	**ORDOVICIAN TO DEVONIAN (?)** LAMINATED CARBONATE AND LIMY MUDSTONE, SILTSTONE; MASSIVE FOSSILIFEROUS LIMESTONE
PALEOZOIC AND/OR MESOZOIC MAFIC TO INTERMEDIATE FLOWS; MINOR TUFFS, VOLCANICLASTICS	▲1 MINERAL OCCURRENCE (*see* TABLE 1)

MINERAL OCCURRENCES

BRITISH COLUMBIA

1 LOW HERBERT, Cu, Pb, (Ag, Au)
2 LOW JARVIS, Cu, (Ag)
3 HIGH JARVIS, Zn, (Ag, Au)
4 HERBERT MOUTH W., Au, Co, (Ag)
5 HERBERT MOUTH E., (Cu, Zn, Co, Ag)
6 HIGH HERBERT N., Cu, (Ag, Au)
7 GRIZZLY HEIGHTS, Au, (Ag)
8 BUCKWELL MORAINE, Cu

ALASKA

9 GLACIER CREEK – MAIN (HAINES Ba), Ba, Zn, Cu, Ag, (Pb)
10 GLACIER CREEK – HANGING GLACIER, Ba, Zn, Pb, Cu, Ag, (Au)
11 GLACIER CREEK – CUP, Ba, Zn, Pb, Ag, (Au)
12 GLACIER CREEK – NUNATAK, Ba, Ag, (Pb, Zn, Cu, Au)
13 BOUNDARY, Ba
14 MT. HENRY CLAY (BOULDERADO), Zn, Cu, Ag, (Pb)
15 JARVIS GLACIER, Zn, Cu, Ag, (Pb, Au)

LOCATION AND TOPOGRAPHY

Mount Henry Clay is located along the British Columbia-Alaska border (Fig. 124), 65 kilometres northwest of Haines, Alaska. The topography of the area is characterized by steep ice-carved ridges and peaks surrounded by valley and hanging glaciers. Access is via helicopter from the Haines Highway, located 10 kilometres northeast of Mount Henry Clay.

EXPLORATION ACTIVITY

Recent exploration work in the Mount Henry Clay area is largely the result of the discovery of the Windy-Craggy deposit (MacIntyre, 1983) located 75 kilometres to the northwest. During the 1984 field season the Stryker-Freeport Resources joint venture prospected their approximately 900 unit Jarvis-Tsirku claim group which covers the area west of Mount Henry Clay. The Tsirku claims were staked in 1983 to cover an area that appeared to be underlain by mafic volcanic rocks similar to those hosting the Windy-Craggy deposit. Work on the property has resulted in the discovery of several new showings, the most significant of which is the Low Herbert (Fig. 125).

In Alaska, several stratabound barite-sulphide occurrences were discovered in the vicinity of Glacier Creek as early as 1969. They are hosted by altered, foliated tuffs or sheared flows within a mafic

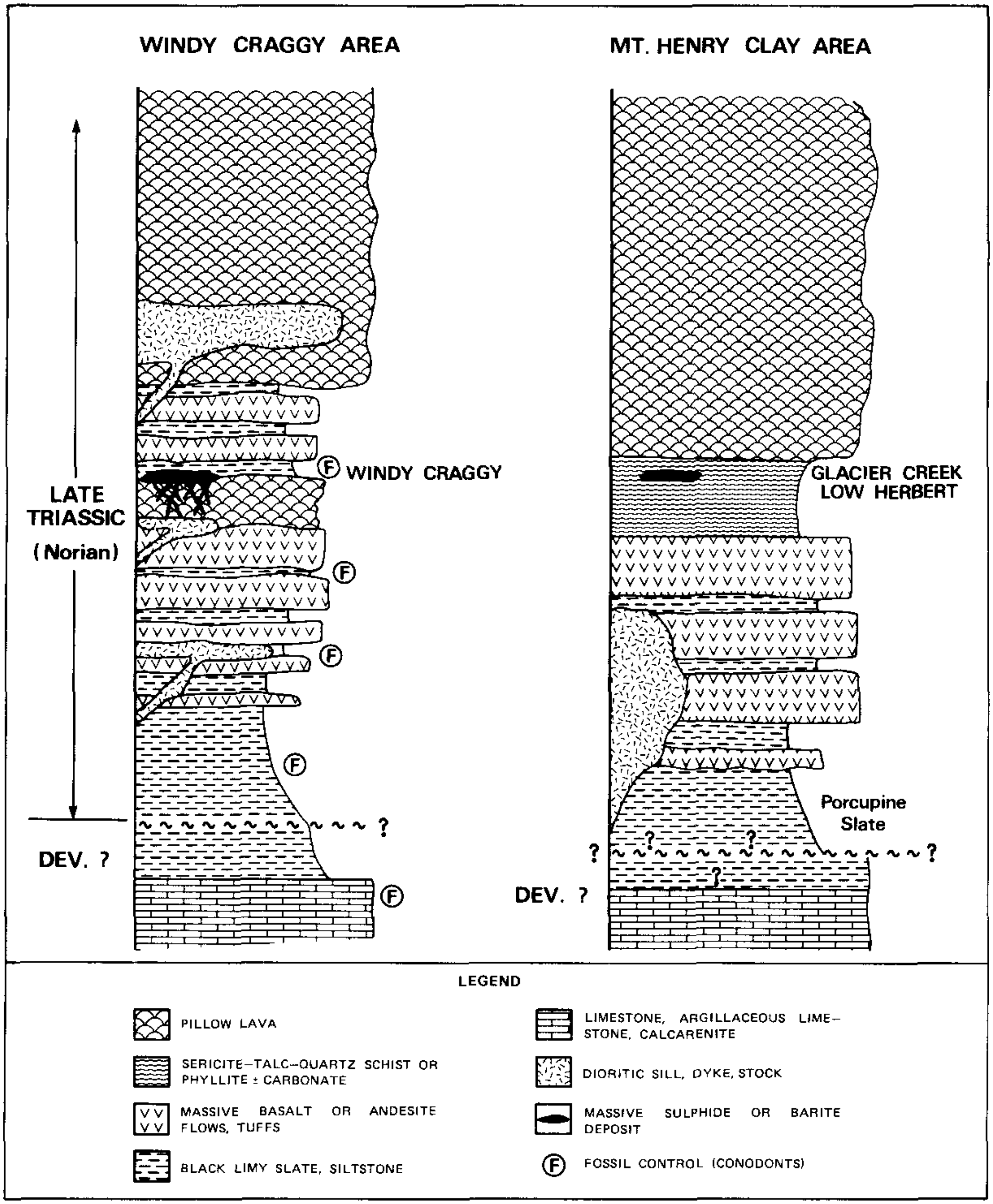

Figure 126. Generalized stratigraphic columns for the Windy-Craggy and Mount Henry Clay areas showing approximate position of mineral occurrences.

volcanic sequence. The most significant of these is the Haines Barite or Glacier Creek Main deposit. In 1983, renewed interest in the area resulted in the discovery of massive sulphide boulders on the north slope of Mount Henry Clay by ALYU Mining Corporation. In 1984, Bear Creek Mining Company diamond drilled this prospect.

GEOLOGIC SETTING

The geology of the Tatshenshini map-area (114P) has been compiled at 1:125 000 scale by the Geological Survey of Canada (Campbell and Dodds, 1983). This work has shown that within the Alexander terrane, which is mainly a belt of Paleozoic basinal sedimentary rocks (Fig. 124), there are also areas underlain by mafic submarine flows and associated volcaniclastic rocks. Originally thought to also be Paleozoic in age, it has now been shown, in the Windy-Craggy area at least, that these submarine volcanic rocks are actually Late Triassic (Norian) and are preserved in downthrown fault blocks within the Paleozoic terrane (MacIntyre, 1984). These Late Triassic submarine volcanic rocks are host to significant stratiform copper-cobalt-zinc-gold deposits such as Windy-Craggy.

On cursory examination the stratigraphic sequence of the Mount Henry Clay area is similar to that of the Windy-Craggy area. In both areas fine-grained basinal clastic rocks are overlain by intermediate to mafic submarine flows (Fig. 126). The inference is that the rocks of the Mount Henry Clay area are also Late Triassic. Unfortunately there are no fossil or isotopic age dates from the Mount Henry Clay area to prove this hypothesis.

Similarly, mapping by E. Redman (Still, 1984) in Alaska indicates that the area east of Mount Henry Clay is predominantly fine-grained clastic rocks (Porcupine slate) overlain by mafic to intermediate submarine flows and intruded by Cretaceous hornblende diorite (Fig. 125). Limestone that contains abundant two-hole crinoid plates is exposed north of Mount Henry Clay and is most likely Devonian in age. The relationship of this unit to apparently underlying and overlying mafic volcanic sequences is uncertain. Originally thought to occupy the core of a synclinal structure, there is now some suggestion that the contacts with the adjacent mafic volcanic units may be high angle faults, with the mafic volcanic sequences being downthrown relative to the apparently Devonian age carbonates. If this relationship is real, and the mafic submarine volcanic rocks are in fact Late Triassic in age, then the Mount Henry Clay area is structurally and stratigraphically similar to the Windy-Craggy area. However, until good fossil or isotopic ages are obtained from these rocks all of these relationships are purely speculative.

MINERAL OCCURRENCES

Although there is gross stratigraphic similarity between the Windy-Craggy and Mount Henry Clay areas, the mineralogy of the presumably stratiform

TABLE 1

		MINERALOGY	TYPE	HOST
BRITISH COLUMBIA OCCURRENCES				
1	LOW HERBERT	Py, Cp, Sp, Ba, (Ag, Au)	Disseminated and banded	Sericite-talc schist
2	LOW JARVIS	Sp, Cp, Ba, (Ag)	Massive (float)	Pyritic felsic tuff or exhalite?
3	HIGH JARVIS	Py, Sp, (Ag, Au)	Massive	Limestone, siltstone, felsic tuff
4	HERBERT MOUTH WEST	Py, Au, Co, (Ag)	Disseminated and massive pods	Pyritic felsic tuff or volcaniclastics in pillow lavas
5	HERBERT MOUTH EAST	Py, Po, (Cp, Sp, Co, Ag)	Disseminated and massive	Andesitic volcaniclastic
6	HIGH HERBERT NORTH	Py, Cp, (Ag, Au)	Disseminated	Felsic to intermediate pyroclastic rocks
7	GRIZZLY HEIGHTS	Py, Po	Massive (float)	Unknown
		Qz, Po, Au, (Ag)	Vein	Sedimentary rocks (?)
8	BUCKWELL MORAINE	Cp, Py, Po, Co	Carbonaceous bands in float	Unknown – probably basalt
ALASKA OCCURRENCES				
9	GLACIER CREEK – MAIN (HAINES BARITE)	Ba, Sp, Cp, Ag, (Gl)	Bands in barite lenses	Carbonate-sericite altered schistose tuff
10	GLACIER CREEK – HANGING GLACIER	Ba, Py, Sp, Gl, Cp, Ag, (Au)	Barite lenses and veins	Pillow basalt
11	GLACIER CREEK – CAP	Ba, Ag, Py, Sp, Gl, Tt, (Au)	Bands in barite lenses	Andesite and basalt ?
12	GLACIER CREEK – NUNATAK	Ba, Ag, Py, (Gl, Sp, Cp, Au)	Barite lenses	Andesite and basalt
13	BOUNDARY	Ba	Barite lens	Altered phyllite ? or schist
14	MT. HENRY CLAY (BOULDERADO)	Sp, Py, Cp, Ag, Ba, (Gl)	Massive float	Chlorite-altered andesite and/or basalt
15	JARVIS GLACIER	Py, Sp, Cu, Ag, (Gl, Au)	Massive and disseminated	Chlorite-altered metasediments and andesites

NOTE: Minerals arranged in order of decreasing abundance or importance. Those in brackets present in minor to trace amounts. Py = pyrite; Cp = chalcopyrite; Sp = sphalerite; Gl = galena; Ba = barite; Po = pyrrhotite; Tt = tetrahedrite; Co = cobaltiferous, mineral phase unknown; Ag = argentifeous, mineral phase unknown; Au = auriferous.

Information on British Columbia occurrences from McDougall, *et al.*, 1983; Alaska occurrences from Still, 1984.

mineral occurrences in these two areas is quite different. Windy-Craggy is essentially a thick lens or series of lenses of massive pyrrhotite and/or pyrite with chalcopyrite, sphalerite, and magnetite-rich zones; it is underlain by chlorite-altered basalts with abundant sulphide stringers and overlain by interbedded limy siltstones and basaltic tuffs (Fig. 126). Mineral occurrences in the Mount Henry Clay area are typically barite rich with thin bands and disseminations of pyrite, pyrrhotite, sphalerite, chalcopyrite, and minor amounts of galena in locally siliceous, sericite-carbonate-talc-altered, foliated tuffs or sheared flows. The mineralized zones are typically underlain by massive andesitic flows with intercalated sedimentary rocks; they are overlain by relatively unaltered massive pillow lavas.

The following section briefly describes the major mineral occurrences in the Mount Henry Clay area. Information on the British Columbia occurrences is derived from an unpublished report by McDougall, *et al.* (1983) of Stryker Resources. The Alaskan occurrences are described in an unpublished report by Jan Still (1984) of the United States Bureau of Mines with appended reports by Earl Redman formerly of C. C. Hawley and Associates.

Location of occurrences is shown on Figure 125; the mineralogy and host rocks are summarized in Table 1. It should be noted that only the Low Herbert, Buckwell Moraine, Glacier Creek Main, and Mount Henry Clay occurrences were examined during our tour of the area. Information on the remaining occurrences is taken from the previously mentioned reports.

BRITISH COLUMBIA OCCURRENCES

Low Herbert (1)

The Low Herbert showing is located on the west side of the Herbert Glacier, within a bright yellow to orange gossanous zone that appears to parallel bedding. This zone, which locally is over 100 metres thick, can be traced for 700 metres along strike before being covered by ice. A thick sequence of pillow lava overlies the mineralized zone, which apparently has a moderate dip to the southwest.

The Low Herbert showing is comprised of bands of disseminated fine-grained pyrite, and lesser chalcopyrite, barite, and sphalerite in a foliated, siliceous, sericite-talc to chlorite-talc-altered tuff or sheared flow. Small white circular structures, which may be accretionary lapilli, are common. Locally the rock is intensely foliated and completely altered to sericite and clay with the foliation deflecting around angular clasts of a black siliceous rock (Plate IX). Chalcopyrite and sphalerite appear to be more abundant in the chlorite-altered parts of the zone. Analytical results for eight samples collected from the Low Herbert showing are summarized in Table 2 (Nos. 1 to 8).

TABLE 2
CHEMICAL ANALYSES*

	Au	Ag	Cu	Pb	Zn	Co	As	Sb
1	<0.3	<10	0.01	0.03	0.31	29	-	-
2	<0.3	<10	0.73	<0.01	0.07	104	-	-
3	<0.3	<10	1.17	<0.01	0.07	96	-	-
4	<0.3	14	0.02	0.01	0.32	36	-	-
5	<0.3	<10	0.49	<0.01	7.04	72	-	-
6	<0.3	<10	1.64	<0.01	0.18	90	-	-
7	<0.3	<10	0.18	<0.01	0.30	64	-	-
8	<0.3	<10	0.10	<0.01	6.46	34	-	-
9	<0.3	<10	2.51	0.03	0.09	1 500	-	-
10	<0.3	<10	0.25	0.01	0.02	1 300	-	-
11	0.7	23	1.27	0.50	15.2	23	174	111
12	0.7	60	0.44	3.60	32.3	<8	844	127
13	<0.3	22	1.12	0.29	36.0	23	767	93
14	0.7	62	1.03	0.22	40.1	29	844	107
15	0.7	10	0.30	0.05	13.4	38	384	29
16	0.7	<10	0.19	0.03	10.5	53	384	27

*Au, Ag, Co, As, Sb in ppm; Cu, Pb, Zn in per cent

1 - Low Herbert - north end of showing, highly bleached, altered tuff with disseminated barite and pyrite
2 - Low Herbert - disseminated chalcopyrite in altered accretionary lapilli (?) tuff
3 - Low Herbert - same as No. 2
4 - Low Herbert - north end of showing, bedded pyrite in altered tuff
5 - Low Herbert - altered tuff with pyrite, sphalerite, barite, and chalcopyrite
6 - Low Herbert - chalcopyrite and pyrite-rich band in altered tuff
7 - Low Herbert - pyrite-rich band in altered tuff
8 - Low Herbert - sphalerite-rich band in altered tuff
9 - Buckwell Moraine - massive pyrite, chalcopyrite float
10 - Buckwell Moraine - massive pyrite float
11-16 - Banded massive sphalerite, barite, pyrite, chalcopyrite, and galena from float from Mount Henry Clay (Boulderado) occurrence

NOTE: Samples 1 to 10 not analysed for As and Sb.

Low Jarvis (2)

The Low Jarvis showing is a rusty-weathering band of felsic, pyritic exhalite or tuff that underlies the thick basalt unit capping Mount Henry Clay. The showing is immediately east of the area drilled by Bear Creek Mining Company.

High Jarvis (3)

The High Jarvis showing is on the steep north-facing slope of an unnamed peak that is located south of the main arm of the Jarvis Glacier. McDougall, *et al.* (1983) describe the showing as a stratiform band

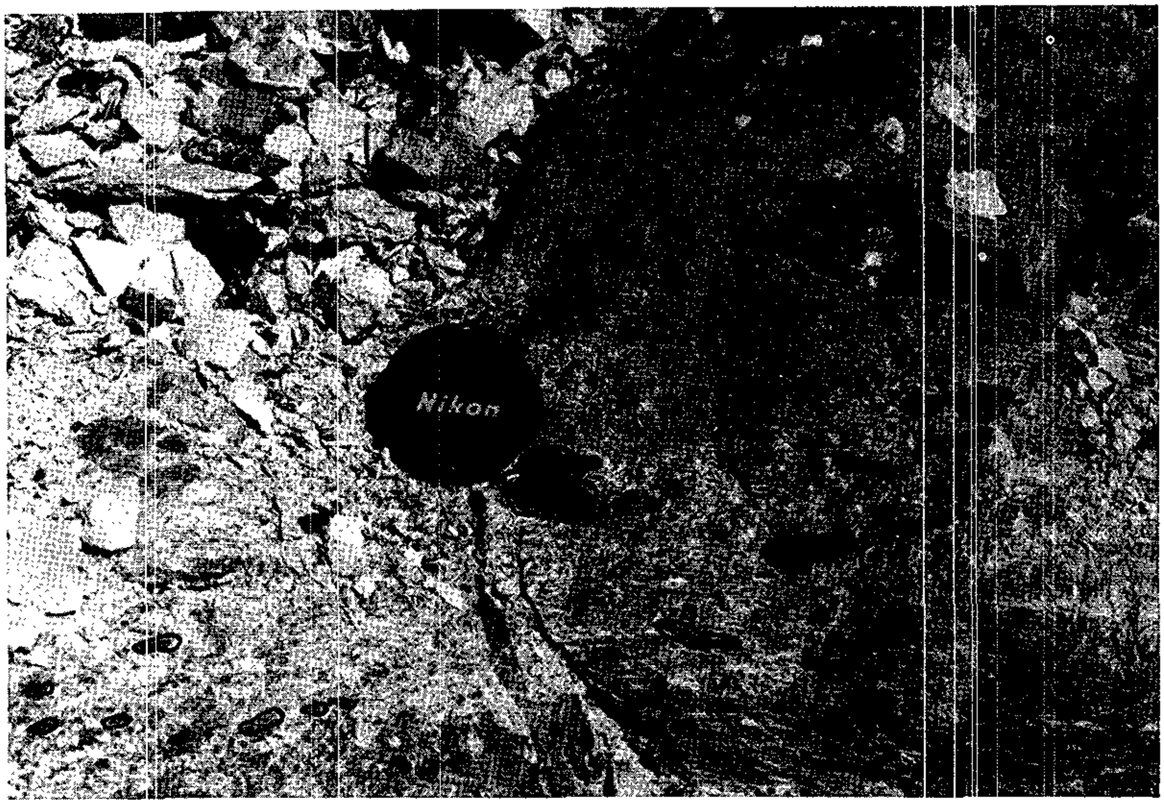

Plate IX. Dark clasts in pervasively altered and foliated tuff, Low Herbert showing.

of massive pyrite and sphalerite occurring in a limestone, silty limestone, siltstone, and felsic tuff sequence. These rocks may be part of the Paleozoic succession.

Herbert Mouth West (4)

This showing is located on the west side of Herbert Glacier, close to its confluence with Tsirku Glacier. It is described as a near vertical zone of pyritic volcaniclastic rocks with local pods of massive pyrite that occurs near the base of a thick pillow lava sequence. A sample of massive pyrrhotite float is reported to have assayed '0.466 ounce per ton gold, 0.129 per cent cobalt with 0.32 ounce per ton silver' (McDougall, *et al.*, 1983, p. 27). These values, if correct, are similar to those obtained from parts of the Windy-Craggy deposit.

Herbert Mouth East (5)

This showing is located near ice level on the east side of Herbert Glacier, close to its junction with Tsirku Glacier. McDougall, *et al.* (1983) describe the showing as pyrite, pyrrhotite, with lesser chalcopyrite and sphalerite in an andesitic volcaniclastic rock. These rocks are part of a large lens of sedimentary and pyroclastic rocks enclosed in unaltered pillow lavas.

High Herbert North (6)

This showing occurs in a saddle on the ridge that extends south from Mount Henry Clay. Disseminated and fracture-controlled pyrite and chalcopyrite are found in a light green andesitic tuff. These rocks are part of a pyroclastic unit that apparently underlies the thick pillow lava sequence which caps Mount Henry Clay. Galena occurs in quartz veinlets and stringers cutting chert beds.

Grizzly Heights (7)

Boulders of massive pyrrhotite and pyrite are reported to occur on the south-facing slope of the ridge between Herbert and Buckwell Glaciers. These boulders apparently occur down slope from the contact between sedimentary rocks and overlying pillow lavas. McDougall, *et al.* (1983) also describe a small quartz vein that contained '0.344 ounce per ton gold and 0.42 ounce per ton silver.'

Buckwell Moraine (8)

Boulders with bands of massive chalcopyrite, pyrite, and pyrrhotite in a quartz and/or carbonate-rich host have been found on a lateral moraine emanating from an eastern tributary of Buckwell Glacier. The source of these boulders has not yet been located. Analytical results for two samples of mineralized float collected from the moraine are summarized in Table 2 (Nos. 9 and 10).

ALASKAN OCCURRENCES

Glacier Creek Main (Haines Barite) (9)

The Glacier Creek Main or Haines Barite is the most economically significant deposit known in the Mount Henry Clay area to date. This deposit is located on a steep southeast-facing slope on the north side of Glacier Creek. The Cap, Hanging Glacier, and Nunatak showings are also considered part of the Glacier Creek occurrence. All of these deposits are hosted by the Glacier Creek sequence of submarine basalt, andesite, and fine-grained clastic rocks (Porcupine slate).

The Main deposit is contained within a steep northeast-dipping zone of foliated and pervasively sericitized tuffs or sheared flows. It has a strike length of approximately 600 metres and is up to several tens of metres thick (Plate X). Within this zone are beds or lenses of massive barite that locally contain bands of sphalerite, galena, and chalcopyrite. The mineralized zone is overlain by massive pillow lavas; it is underlain by andesitic to basaltic flows with intercalated sedimentary rocks. Still (1984) reports that a bulk sample collected from the deposit contained '76.4 per cent $BaSO_4$, 3.6 per cent zinc, 0.98 per cent copper, 0.12 per cent lead, and 92 ppm silver.' Geological reserves are estimated to be 3 to 4 million tons, although only one of three drill holes completed to date has intersected the deposit.

Plate X. View of the Glacier Creek Main (Haines Barite) deposit. Dashed line outlines zone of pervasively altered and foliated tuff that contains barite-sulphide lenses. Zone is overlain and underlain by massive basaltic flows.

Glacier Creek - Hanging Glacier (10)

The Hanging Glacier occurrence consists of barite lenses and quartz-carbonate veins that contain pyrite, sphalerite, galena, and chalcopyrite with anomalous silver and gold values. The barite lenses occur in a steep northwest-dipping gossan zone that underlies massive pillow lavas.

Glacier Creek - Cap (11)

The Cap occurrence is a barite lens up to 3 metres thick that contains pyrite, sphalerite, galena, and tetrahedrite. Like the other Glacier Creek occurrences, it is contained within a gossanous zone that is overlain by massive basaltic flows. Although base metal values are relatively low, Still (1984) reports silver assays as high as 277 ppm.

Glacier Creek - Nunatak (12)

The Nunatak occurrence is a steeply southwest-dipping barite bed or lens, up to 1 metre thick, that contains up to 19 ppm silver and 0.24 ppm gold (Still, 1984) despite relatively low lead, zinc, and copper. The host rocks are mainly andesite and basalt flows, similar to those hosting the other Glacier Creek occurrences.

Boundary (13)

The Boundary occurrence is located on the crest of the ridge extending south from Mount Henry Clay; it is close to or on the British Columbia-Alaska border. The occurrence is a 20-centimetre-thick bed or lens of barite with low metal values that is hosted by foliated volcanic rocks or phyllites. These rocks occur at the transition from Porcupine slate to overlying massive intermediate to basaltic flows.

Mount Henry Clay (Boulderado) (14)

Rounded to angular boulders and blocks of massive sphalerite, with bands of barite, pyrite, and chalcopyrite occur on the north-facing slope of Mount Henry Clay, just below the terminus of a small hanging glacier and very close to the Alaska-British Columbia border (Plate XI). Bear Creek Mining Company drilled two holes upslope from this showing in an attempt to locate the source of the boulders. This work and surface mapping indicates that the area of interest is largely underlain by massive andesitic flows that are locally altered and mineralized. This andesitic unit apparently dips southwest and is overlain by the massive pillow lavas that cap Mount Henry Clay. The only outcrop in the vicinity of the massive sulphide boulders is a southwest-dipping, foliated chloritic flow or tuff that contains disseminated pyrite. This type of alteration and sulphide mineralization is very similar to that found in the stratigraphic footwall of the Windy-Craggy deposit.

Still (1984) reports that massive sulphide boulders from the Mount Henry Clay (Boulderado) occurrence 'contain from 20 per cent to 44 per cent zinc, about 5 per cent barium, and several per cent of copper.' Analytical results for six samples of massive sulphide collected during our visit to this occurrence are summarized in Table 2 (Nos. 11 to 16). Silver values for these samples range from less than 10 to 62 ppm; gold is only slightly anomalous with values up to 0.7 ppm.

Plate XI. View of Mount Henry Clay looking south. White circles indicate area of massive sulphide float. Dashed line is approximate location of Alaska-British Columbia boundary.

Jarvis Glacier (15)

Several occurrences of stratabound sphalerite, pyrite, chalcopyrite, galena, and barite occur on the north-facing slope above Jarvis Glacier. The host rocks are part of a unit of interbedded slate, limestone, and andesite that is capped by massive andesitic flows and basaltic pillow lavas. Still (1984) reports that the massive sulphide lenses occur within a zone of chloritic metasedimentary rocks and are associated with quartz and calcite-rich bands. Samples of massive sulphide contained up to '17.8 per cent zinc, 0.3 per cent lead, 1.3 per cent copper, 0.163 ppm gold, and 11.56 ppm silver' (Still, 1984, p. 11).

SUMMARY

The following conclusions appear to be valid based on the limited amount of data available to date:

(1) There is a gross similarity in the stratigraphic position of mineral occurrences in the Windy-Craggy and Mount Henry Clay areas. However, the age of the host rocks in the two areas may be different.

(2) The immediate host rocks for stratabound barite-sulphide deposits of the Mount Henry Clay area are probably tuffs or sheared flows rather than pillow lavas.

(3) Host rocks in the Mount Henry Clay area are generally foliated and contain more sericite, talc, and quartz, and less stringer sulphide and chlorite alteration than those at Windy-Craggy.

(4) The mineral occurrences in the Mount Henry Clay area contain more barite and sphalerite, and less pyrrhotite, chalcopyrite, and magnetite than those of the Windy-Craggy area.

(5) Massive sulphide occurrences in the Mount Henry Clay area generally have lower cobalt concentrations than those of the Windy-Craggy area. Exceptions to this are the Herbert Mount West and Buckwell Moraine showings.

These differences in mineralogy and nature of host rock alteration and composition between the Windy-Craggy and Mount Henry Clay areas suggests different environments of formation. As pointed out by Finlow-Bates (1980), temperature is the most important controlling factor on the mineralogy of submarine massive sulphide deposits. This concept is illustrated on Figure 127. The barite-rich, pyrrhotite-deficient deposits

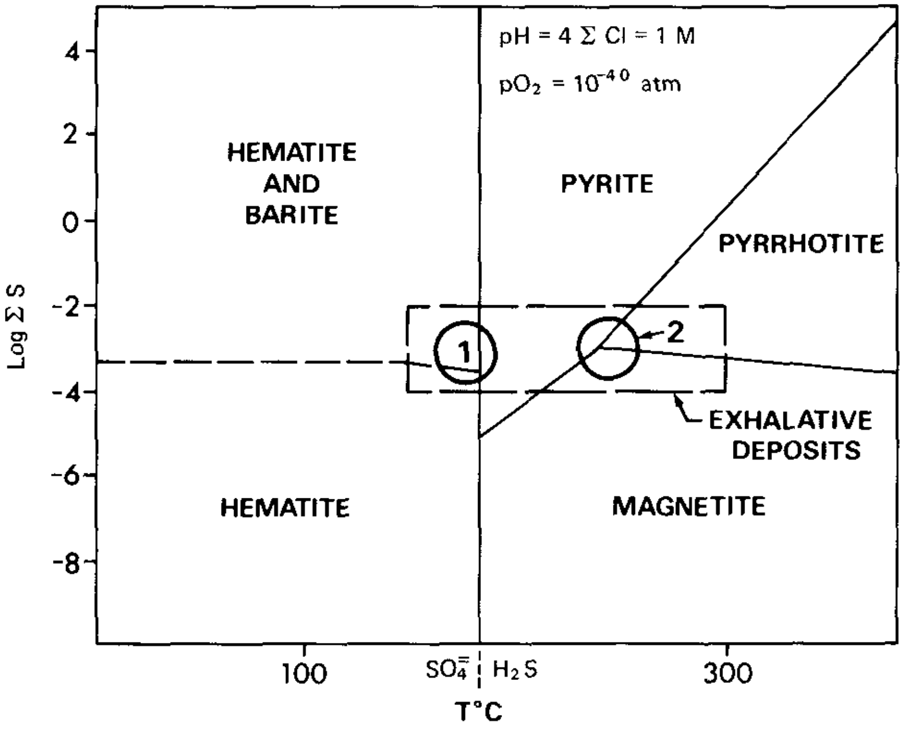

Figure 127. Stability fields of phases common in submarine exhalative deposits when formed from a solution with total Cl^- = 1M; pO_2 = 10 atm; pH = 4. Diagram from Finlow-Bates (1980). Circles represent hypothetical fields of formation based on the mineralogy of mineral occurrences in the Mount Henry Clay (circle 1) and Windy-Craggy (circle 2) areas.

of the Mount Henry Clay area may have formed at lower temperatures than the pyrrhotite-pyrite-rich, barite-deficient Windy-Craggy deposit. Also, the association of sericite, talc, carbonate, and quartz with the Mount Henry Clay occurrences may indicate boiling of hydrothermal fluids has taken place. Lower fluid temperatures and boiling suggest shallower water and/or a more vent-distal site of mineral deposition in the Mount Henry Clay area.

ACKNOWLEDGMENTS

The authors are most grateful to Stryker Resources and Bear Creek Mining Company for permission to visit their respective properties, for their most generous hospitality, and for the free exchange of geologic information and ideas. Discussions with Doug Perkins of Stryker Resources, Jan Still of the United States Bureau of Mines, Dan Rosenkrans and Rich Leveille of Bear Creek Mining Company, and Bruce Hickok of C. C. Hawley and Associates were most informative and helpful in assessing the area.

REFERENCES

Campbell, R. B. and Dodds, C. J. (1983): Geology, Tatshenshini Map-area (114P), *Geol. Surv., Canada,* Open File 926.

Finlow-Bates, T. (1980): The Chemical and Physical Controls on the Genesis of Submarine Exhalative Orebodies and their Implications for Formulating Exploration Concepts - A Review, *Geol. Jb.,* Vol. 40, pp. 131-168.

MacIntyre, D. G. (1983): A Comparison of Stratiform Massive Sulphide Deposits of the Gataga District with the Midway and Windy-Craggy Deposits, Northern British Columbia, *B.C. Ministry of Energy, Mines & Pet. Res.,* Geological Fieldwork, 1982, Paper 1983-1, pp. 149-170.

.... (1984): Geology of the Alsek-Tatshenshini Rivers Area (114P), *B.C. Ministry of Energy, Mines & Pet. Res.,* Geological Fieldwork, 1983, Paper 1984-1, pp. 173-184.

McDougall, J., Perkins, D., and Galatiotis, A. (1983): Geological Report of the Tsirku Group Mineral Claims, *Stryker Resources,* private rept., November 1983, 34 pp.

Still, J. (1984): Stratiform Massive Sulfide Deposits of the Mount Henry Clay Area, Southeast Alaska, *U.S. Bur. Mines,* Alaska Field Operations Center, Juneau, Alaska.

TABLE 1
TITANIA CONTENT OF TAILINGS FROM SELECTED PORPHYRY DEPOSITS IN BRITISH COLUMBIA

No.	Deposit Name	No. of Samples	Titania Analyses (%) Range	Mean	Standard Deviation
A. Calc-alkaline suite porphyry copper deposits					
1	Bell	10	0.34-0.64	0.49	0.08
2	Bethlehem	2	0.35-0.43	0.39	0.06
3	Brenda	7	0.30-0.43	0.38	0.06
4	Gilbraltar	5	0.43-0.43	0.43	0.00
5	Granisle	8	0.40-0.78	0.56	0.13
6	Highmont	7	0.30-0.43	0.31	0.05
7	Island Copper	6	0.49-0.87	0.57	0.15
8	Lornex	12	0.30-0.43	0.35	0.05
Group		8		0.435	0.096
B. Alkaline suite porphyry deposits					
9	Afton	8	0.54-0.68	0.62	0.05
10	Granby	2	0.51-0.61	0.56	0.08
11	Newmont	9	0.33-0.97	0.67	0.21
	(i) Ingerbelle	6	0.52-0.97	0.77	0.15
	(ii) Copper Mtn.	3	0.33-0.53	0.44	0.10
Group		3		0.617	0.055
C. Porphyry molybdenite deposits					
12	Boss Mountain	2	0.35-0.43	0.39	0.06
13	Kitsault	4	0.49-0.57	0.56	0.04
Group		2		0.475	0.120
D. Others					
14	Equity Silver	4	0.81-0.97	0.84	0.08